$8N_c$ across the upper and lower rows of pixels. This arrangement of the central segments 86 provides a factor of 2 increase in resolution over the middle segments 84.

In this embodiment, similar processes to those described above could also be used to compensate the different signal levels for the various pixel densities. In this sensor layout, the three stacked linear arrays 110–112 might be used separately from each other, or simultaneously, to produce a resulting image. One benefit of using the arrays separately would include a relative minimization, as compared to the prior embodiments, of analog sensor arithmetic operations. When used simultaneously, the increased pixel area would improve the resulting image quality, but at the tradeoff expense of an increased data rate which would require more memory and processing capabilities.

The disclosed embodiments show certain ratios of pixel area and density as used in segments described as peripherial, middle, and/or central segments. While these descriptions were meant to illustrate the invention, such embodiments are not meant limit the relative placement of these various segments to those shown. It may be desirable, for example, to move the "central" region to one end of the sensor array. In addition, the differention between regions of different pixel area and density were illustrated as belonging to different segments. This may be desirable, but is not intended to be a limiting feature. Moreover, the choice of which region(s) are to be used could be determined by an automatic correlation with the width of the original image. Alternatively, a manual selection process might be used.

More generally, it is to be understood that while certain forms of the invention are illustrated, they are not to be limited to the specific forms or arrangements of parts herein described and shown. It will be apparent to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and descriptions.

What is claimed is:

1. A multiple resolution sensing apparatus, comprising:

a first photosensor segment having a first plurality of photosensitive elements; and,

a second photosensor segment, adjacent to the first photosensor segment, the second photosensor segment having a second plurality of photosensitive elements, wherein density of photosensitive elements within the second photosensor segment is greater than density of photosensitive elements in the first photosensor segment;

wherein when scanning at a first resolution, both the first photosensor segment and the second photosensor segment are used;

wherein when scanning at a second resolution, the second photosensor segment is used and the first photosensor segment is not used; wherein the second resolution is greater than the first resolution; and

wherein a maximum image size for a scanned image is smaller when scanning at the second resolution than when scanning at the first resolution.

2. A multiple resolution sensing apparatus as in claim 1 additionally comprising:

a third photosensor segment, adjacent to the second photosensor segment, the third photosensor segment having a third plurality of photosensitive elements, wherein density of photosensitive elements within the third photosensor segment is greater than density of photosensitive elements in the second photosensor segment;

wherein when scanning at the first resolution and at the second resolution, the third photosensor segment is also used;

wherein when scanning at a third resolution, the third photosensor segment is used while the first photosensor segment and the second photosensor segment are not used;

wherein the third resolution is greater than the second resolution; and

wherein a maximum image size for a scanned image is smaller when scanning at the third resolution than when scanning at the second resolution.

3. A multiple resolution sensing apparatus as in claim 1, wherein the first photosensor segment and the second photosensor segment are arranged in a linear array.

4. A multiple resolution sensing apparatus as in claim 3, wherein the linear array has a central region and peripheral regions, the second photosensor segment is in the central region and the first photosensor segment is in one of the peripheral regions.

5. A multiple resolution sensing apparatus as in claim 1:

wherein photosensitive elements in the first photosensor segment have a larger element size than photosensitive elements in the second photosensor segment; and

wherein the photosensitive elements produce electrical signals corresponding to the element size;

the multiple resolution sensing apparatus additionally comprising a compensation means for processing the electrical signals.

6. A multiple resolution sensing apparatus as in claim 5, wherein the compensation means substantially equalizes the electrical signals produced by different groupings of photosensitive elements.

7. A multiple resolution sensing apparatus as in claim 1, wherein resulting image resolution is manually selectable.

8. A multiple resolution sensing apparatus as in claim 1, wherein resulting image resolution is automatically selected based upon an original image.

9. A multiple resolution sensing apparatus as in claim 1, additionally comprising:

a third photosensor segment, adjacent to the first photosensor segment opposite the second photosensor segment, having a third plurality of photosensitive elements, wherein density of photosensitive elements within the third photosensor segment is equal to density of photosensitive elements in the first photosensor segment;

wherein when scanning at the first resolution, the third photosensor segment is also used; and

wherein when scanning at the second resolution, the third photosensor segment is not used.

10. A method for scanning at multiple resolutions, the method comprising the following steps:

(a) when scanning at a first resolution, performing the following substeps:

(a.1) scanning a first portion of an original image using a first plurality of photosensitive elements within a first photosensor segment, and

(a.2) scanning a second portion of the original image using a second plurality of photosensitive elements within a second photosensor segment, wherein the second photosensor segment is adjacent to the first photosensor segment and density of photosensitive elements within the second photosensor segment is greater than density of photosensitive elements in the first photosensor segment; and,

(b) when scanning at a second resolution, scanning using the second plurality of photosensitive elements within the second photosensor segment but not using the first plurality of photosensitive elements within the first photosensor segment, wherein the second resolution is greater than the first resolution.

11. A method as in claim **10** wherein a maximum image size is smaller when scanning at the second resolution than when scanning at the first resolution.

12. A method as in claim **10** additionally comprising the following step:

(c) when scanning at a third resolution, scanning using a third plurality of photosensitive elements within a third photosensor segment but not using the first plurality of photosensitive elements within the first photosensor segment or the second plurality of photosensitive elements within the second photosensor segment, wherein the third resolution is greater than the second resolution.

13. A method as in claim **12**, wherein step (a) additionally comprises the following substep:

(a.3) scanning a third portion of the original image using the third plurality of photosensitive elements within the photosensor segment, wherein the third photosensor segment is adjacent to the second photosensor segment and density of photosensitive elements within the third photosensor segment is greater than density of photosensitive elements in the second photosensor segment.

14. A method as in claim **10**, wherein the first photosensor segment and the second photosensor segment are arranged in a linear array.

15. A method as in claim **14**, wherein the linear array has a central region and peripheral regions, the second photosensor segment is in the central region and the first photosensor segment is in one of the peripheral regions.

16. A method as in claim 10 wherein in step (a) photosensitive elements in the first photosensor segment have a larger element size than photosensitive elements in the second photosensor segment, the photosensitive elements producing electrical signals corresponding to the element size.

17. A method as in claim 16, wherein step (a) additionally comprises the following substep:

(a.3) substantially equalizing electrical signals produced by different groupings of photosensitive elements.

18. A method as in claim 10, additionally comprising the following step:

manually selecting resulting image resolution.

19. A method as in claim 10, additionally comprising the following step:

automatically selecting image resolution based upon an original image.

20. A method for scanning at multiple resolutions, the method comprising the following steps:

(a) automatically selecting resulting image resolution based on an original image, including the following substeps:

(a.1) when an original image has a width within a first predetermined range, selecting a first resolution, and

(a.2) when the original image has a width within a second predetermined range, selecting a second resolution;

(b) when in step (a) the first resolution is selected, scanning the original image at the first resolution; and,

(c) when in step (a) the first resolution is selected, scanning the original image at the first resolution.

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